

REMARKS

Reconsideration of the above-identified patent application as amended herein is respectfully requested. Claims 1-22 are cancelled, and claims 23-44 are added. Thus, claims 23-44 are now pending in this application. Of these, only claim 23 is independent.

In the Office Action, the Examiner rejected claims 1-22, under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants gratefully acknowledge the Examiner's indication that claims 1-16 contain allowable subject matter, and would be allowable if rewritten or amended to overcome the rejection under 35 U.S.C. 112, second paragraph. Applicants have cancelled claims 1-22, and added claims 23-44 to further clarify the invention and with consideration of the informalities noted in the Office Action. The claims are now believed to overcome the rejection under 35 U.S.C. 112, second paragraph.

In the Office Action, the Examiner rejected claims 17-22 under 37 U.S.C. 103(a) as being unpatentable over Tivelius (US Patent No. 4,401,464, hereinafter US '464). Applicants respectfully traverse this rejection.

The presently claimed invention is directed to a method to alloy a steel melt with a gaseous alloying constituent and to an apparatus to implement the method. The alloying constituent is introduced into the apparatus of claim 17, now claim 39, by a first metering device which feeds such gaseous constituent into the atmosphere contained in a vessel which is not completely gas-tight and which is situated above the steel melt. The apparatus is also equipped with a second metering device which feeds an inert gas into the vessel and with an evaluation

unit which evaluates the total pressure, the temperature and the concentration of the inert gas and of the gaseous alloying constituent. The apparatus of the presently claimed invention is also equipped with a controlling device which controls the metering of the inert gas and of the gaseous constituent taking into account the evaluation performed by the evaluation unit. Thus, the composition of the atmosphere above the steel melt is maintained at a level optimized for the alloying of the melt, which takes place as result of the presence of the gaseous constituent in the atmosphere above the melt. This method makes it possible to determine on an ongoing basis the materials transferred from a gas component to the metal alloy in the metal bath, and it makes it possible to produce with high precision a material with the concentration of the relevant gaseous alloying constituent.

Accordingly, new claim 39 recites:

“A device...comprising:

...**a first metering device** which feeds an alloying constituent into the vessel, said alloying constituent being gaseous in its normal state;

...**a pressure sensor** which registers a total pressure of the atmosphere contained in the vessel;

...**an evaluation unit** which evaluates the total pressure, the temperature of the atmosphere and the concentrations of the inert gas and of the gaseous alloying constituent; and

a control device which controls the feeding of the inert gas and of the gaseous alloying constituent into the vessel based upon the evaluation of the evaluation unit.”

US '464 relates to a method and to a device for producing steel free from slug inclusions. However, US '464 does not teach or suggest the possibility of using a gaseous constituent for alloying a steel, because the feeding device of US '464 provides nitrogen to the steel melt in the vessel by feeding calcium cyanamide in the vessel. Since commercial calcium cyanamide is in powder form, the apparatus of US '464 corresponds to the state of the art described in the introduction of the Specification of the present application. As it is explained on the first paragraph of page 4 of the Specification, the disadvantage of providing nitrogen to the steel melt by adding material containing nitrogen is that it is impossible to know the final exact amount of nitrogen added. Thus, the addition of a powder containing nitrogen to the steel melt does not make possible the production of a material in which the desired concentration is known with high precision as in the presently claimed invention.

In addition, US '464 does not teach or suggest a device comprising an evaluation device and a controlling device as the device claimed in claim 39. In fact an evaluation device and a controlling device are not needed to perform the method disclosed by US '464. According to US '464, the atmosphere in the vessel is maintained over the steel melt by a constant introduction of fresh inert gas into the vessel, independently from whether the treatment of the steel melt is running or not. Accordingly, the only gaseous constituent passing into the vessel is the inert gas which flows constantly out of the vessel through the gap 9 between the vessel hood covering the vessel top opening. The only purpose of the inert gas into the vessel is to prevent the presence of air into the vessel to avoid oxidation of the steel melt.

Accordingly, as US '464 does not disclose or suggest the teachings of claim 39, claim 39 and the other claims dependent upon it are not rendered obvious by US '464 and the withdrawal of rejections under 35 U.S.C. 103(a) is respectfully requested.

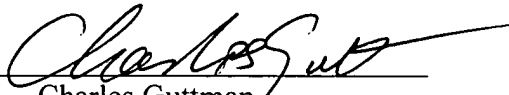
Thus, in view of the foregoing, it is believed that the present application is now in condition for allowance and a favorable action on the merits is respectfully requested.

The Commissioner is authorized to deduct any fees resulting from this Amendment from deposit account number 16-2500 of the undersigned.

The undersigned attorney requests that the Examiner contact him at the telephone number indicated below if it would help expedite prosecution of this application.

Respectfully submitted,

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Enclosures: Petition for a two month extension of time